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Office Memorandum • UNITED STATES GOVERNMENT

TO : Chief, External Projects/Research & Develop/OC-E DATE: APR 7 1960

FROM : Contracting Officer

SUBJECT: Contract No. RD-138, Task Order No. 4
with [redacted] 25X1

1. Attached is a copy of a Patent Report on a "Battery Charging Handcrank Generator, HG-3", reported as an invention under this case by the Contractor. The Contractor has not indicated whether it intends to file a patent application on the invention and we are writing to request that information.

2. Meanwhile, will you tell us whether the subject matter of the invention is considered classified aside from our interest in it so that a patent application would have to be submitted on a classified basis. Will you also tell us whether, if the Contractor does not file a patent application, you wish to exercise the Government's option to take an assignment of the invention and investigate the possibility of obtaining a patent on behalf of the Government.

[redacted] 25X1

Attachment:
As stated herein.

Distribution:
Orig & 1 - Addressee
1 - RD-138, TO#4 (Official)
1 - Patent File
1 - CAB
1 - T&SB
1 - Chrono

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OL/PD/T&SB [redacted] (6 April 1960) 25X1

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March 31, 1960

IN REPLY REFER TO W.O. 604

25X1

Subject: Contract No. RD-138
Task Order No. 4
Patent Report - Battery Charging Handcrank Generator, HG-3

Dear Sir:

Enclosed find Patent Report on Battery Charging Handcrank Generator, HG-3.

In this connection we are also enclosing invoice, original and three copies, for resubmission of patent withholding.

Very truly yours,

25X1

25X1

Encs. Copy of Patent Report

PATENT REPORT

BATTERY CHARGING HANDCRANK GENERATOR, HG-3

Specification No. 58-A1071-A
Dated 8 May 1958

[redacted] W.O. 604)

STAT

Distribution: ARD (original)
Contracting Officer (cc.)
[redacted]

STAT

March 30, 1960

PATENT REPORT

BATTERY CHARGING HANDCRANK GENERATOR, HG-3

The HG-3 generator contains a four-pole, salient pole rotor constructed of a ceramic permanent magnet material known as Indox 5 and manufactured by Indiana Steel Products, Inc. Many charging generators would normally use a rotor made of Alnico permanent magnet material, particularly in those cases where high electrical efficiency is not a particularly critical factor. The use of the Indox material was dictated by the need for the highest possible efficiency, and the subetitution of this material definitely resulted in an improvement of this parameter. The major reason for this improvement is that the ceramic material is electrically non-conductive and therefore the eddy current losses,that normally would be encountered in the use of an Alnico rotor, are reduced to a negligible amount. While we do not know whether this has been done before or may be a patentable feature, we certainly can say that it is not common practice as we have never heard of a generator using a ceramic rotor.

The second feature of possible patentable value deals with the method in which we attain the constant current characteristic called for in the specification. Most constant current devices maintain their output current at a steady value by generating a high voltage and placing in series with this voltage a resistor having a much higher impedance than the load. While this is very simple, it does result in efficiency since most of the power is

lost in the series or source resistance. Again, since efficiency was most important in this application, the above method was prohibitive. In our development, to maintain a constant output current, we have deliberately designed the generator to have a high inherent A.C. impedance (largely inductive in nature) which, in effect, is in series with the high voltage generated in the windings. Because we are charging a battery which has a very low load impedance, the high source impedance determines the output current. Furthermore, since this high source impedance is inductive, it increases linearly with frequency as does the generator voltage. Therefore, if the cranking speed doubles, the generated voltage and the source inductive impedance doubles, maintaining the current at the original level. Constant current, therefore, is maintained without large source losses since the D.C. resistance of the source impedance is designed to have a very low value and, therefore, low power loss.

Because the application itself is rather unique, the above concept for constant-current delivery may also be unique and, as such, patentable. In other words, while not a startling breakthrough in the state of the art, it nevertheless may contain some originality of design simply because there has been little necessity for the development of such an operating feature previous to this project.

The remaining features of the generator are considered merely variations of existing circuit design and are very probably not patentable in any respect.

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March 30, 1960

HEN:gs